










Date: Friday, 21/11/2008 8:59:45 AM
 User: Julie Dawson

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: X-TUBE AS 350/355 HI AFT
Job Number	: 43673		
Estimate Number	: 13225		
P.O. Number	:	Part Number	: D350748241TRN
This Issue	: 21/11/2008 S.O. No. :	Drawing Number	: D350-748-241 REV.D
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : CROSSTUBES	Drawing Revision	: D
Previous Run	: 43672	Material	:
Written By	:	Due Date	: 28/11/2008 Qty: 1 Um: Each
Checked & Approved By	: <u>JUD 08.11.21</u>		
Comment	: Est Rev:A New Issue 08-03-06 DD verified by:ec Est Rev B Removed polish 08.04.02 EC verified by : DD Est Rev C Removed LPS-3 08.06.23 Ec verified by: DD		
Additional Product			
Job Number: 			
Seq. #:	Machine Or Operation:	Description :	
1.0	D6018125	Crosstube Material	
			
Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s) Crosstube Material, D6018-125 2.299" OD X 2.000" ID Batch: <u>B27472</u>			
2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE	
			
Comment: MORI SEIKI CNC LATHE LARGE 1-Fill tube with sand & install plugs on both ends as per Folio FA647 2-Turn first side as per Folio FA647 3- File transition lines smooth.			
3.0	QC1	INSPECT ALL DIM TO DIM SHEET	
			
Comment: INSPECT ALL DIM TO DIM SHEET			
4.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE	
			
Comment: MORI SEIKI CNC LATHE LARGE 1-Turn second side as per Folio FA647 2- File transition lines smooth.			

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Drawing Name: X-TUBE AS 350/355 HI AFT

Job Number: 43673

Part Number: D350748241TRN

Job Number:



Seq. #: Machine Or Operation: Description :

3-Scribe part # as per Dwg D350-748-241

am 08.12.04 ②

5.0 QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

am 08.12.04 ②

6.0 QC8

SECOND CHECK



Comment: SECOND CHECK

08.12.04 ②

7.0 LARGE FAB 1

LARGE FABRICATION RESOURCE 1



AWM 8.12.04



Comment: LARGE FABRICATION RESOURCE 1

Grind machining marks.

8.0 OUTSIDE SERV.11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 7849

Heat Treat to min 180 KSI As per Dwg D350-748-241

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

C208112116 ①

9.0 PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformaty is attached

PC 9/01/08 ①

10.0 QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

50910429 ②

11.0 PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and stock in kanban/rack

Location: *Back Hall*

MB 09.01.09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Drawing Name: X-TUBE AS 350/355 HI AFT

Job Number: 43673

Part Number: D350748241TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC21

FINAL INSPECTION/W/O RELEASE



09/02/02 *[Signature]*

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF 09-02-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: <u>H3073</u>
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number: D350-748-241
Inspection Dwg: D350-748-241 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.185	/			
	2.208	+0.005/-0.000	2.211	/			
	2.234	+0.005/-0.000	2.239	/			
	2.253	+0.005/-0.000	2.258	/			
	2.272	+0.005/-0.000	2.277	/			
	2.299	+0.005/-0.000	2.299	/			
	0.063	+/-0.010	0.063	/			
	4.26	+/-0.030	4.26	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.50	/			
SIDE B	2.240	+0.005/-0.000	2.245	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.185	/			
	2.208	+0.005/-0.000	2.211	/			
	2.234	+0.005/-0.000	2.239	/			
	2.253	+0.005/-0.000	2.258	/			
	2.272	+0.005/-0.000	2.277	/			
	2.299	+0.005/-0.000	2.299	/			
	0.063	+/-0.010	0.063	/			
	4.26	+/-0.030	4.26	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.50	/			
	122.70	+/-0.060	122.750	/			

Measured by: <u>a.m</u>	Audited by: <u>S</u>	Prototype Approval:	N/A
Date: <u>08.12.04</u>	Date: <u>08/12/04</u>	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART

DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>///</i>	APPROVED <i>///</i>	DRAWING NO. D350-748-241	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6018-125 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

RELEASED06.10.31 *///*

QTY	P/N	DESCRIPTION
X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
1	D6018-125	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6018-125 OR D6015-125
FINISHED LENGTH = 122.70±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW07.02/16 *///*CUT FENG REDUCED
OK 07.02.22

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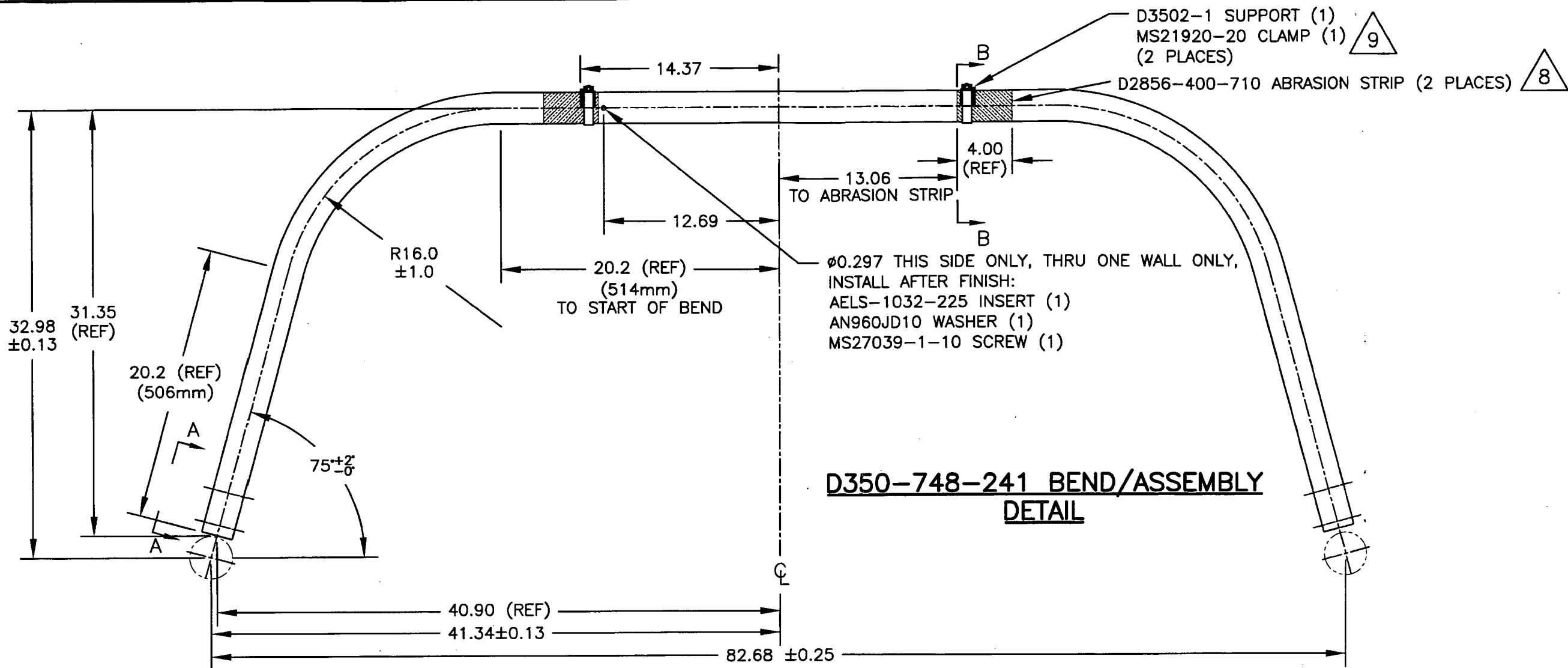
W/O:		WORK ORDER CHANGES					
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

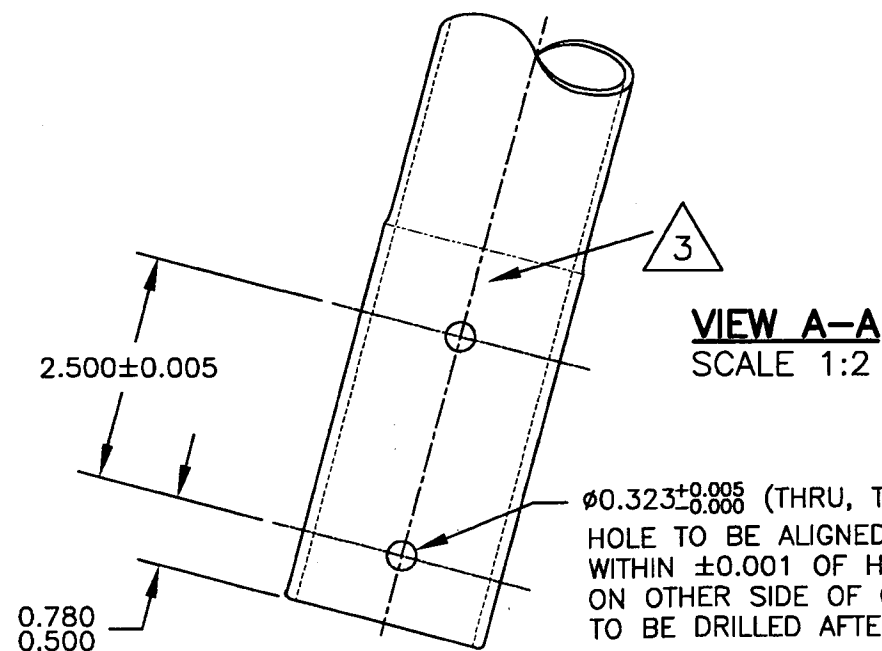
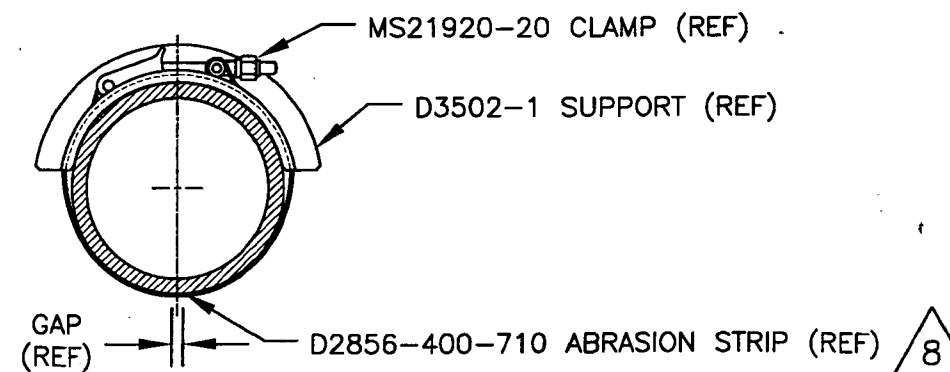
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D350-748-241 BEND/ASSEMBLY DETAIL

SECTION B-B SCALE 1:2



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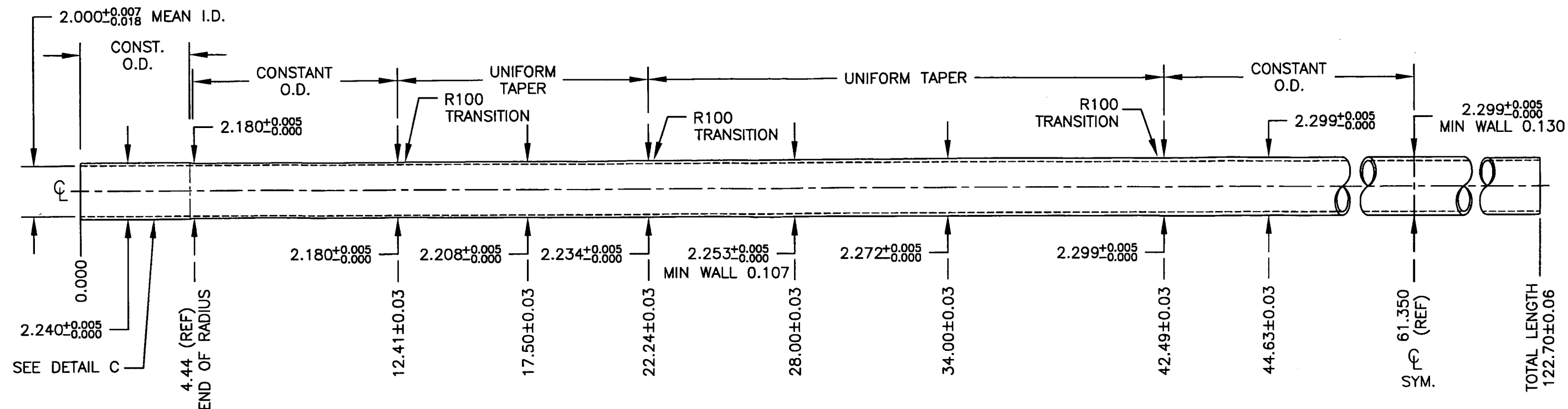
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OK 07.11.22

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06.10.31

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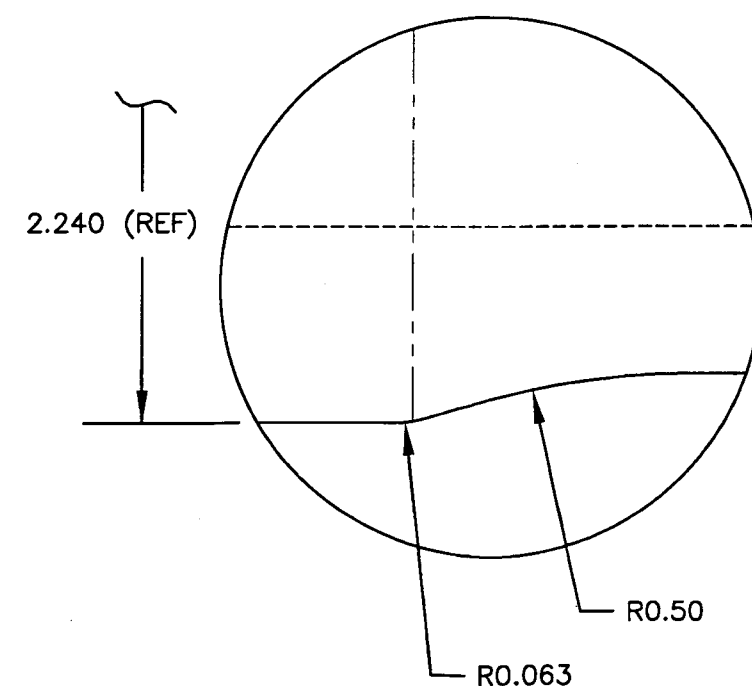
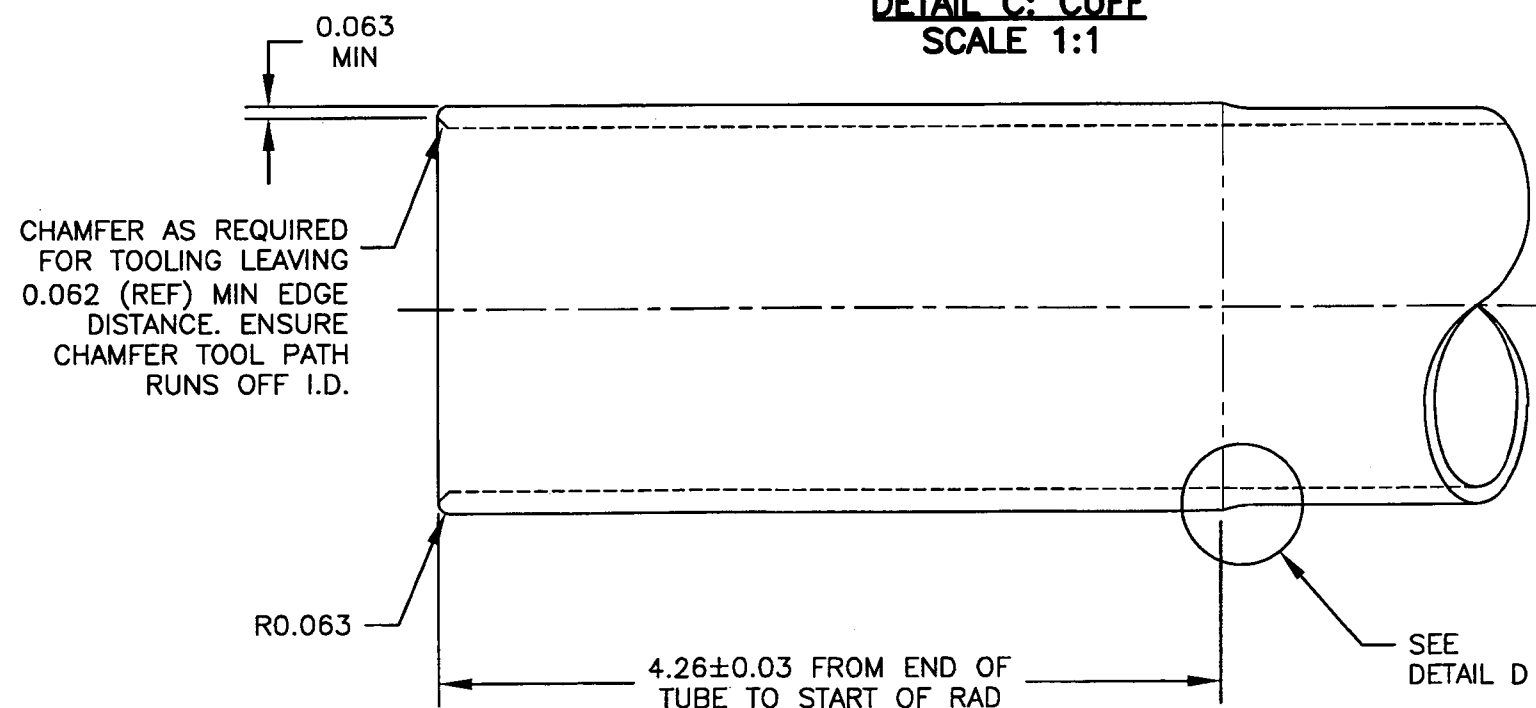
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DESIGN 90	DRAWN BY 90	DART	DART AEROSPACE LTD. HAVERSBURY, ONTARIO, CANADA
CHECKED H	APPROVED H	DRAWING NO. D350-748-241	REV. D SHEET 2 OF 3
DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI AFT)	SCALE 1:8	



D350-748-241 MACHINING DETAIL

DETAIL C: CUFF SCALE 1:1



DETAIL D: CUFF TRANSITION SCALE 9:1

UNDER REVIEW
07.02/16
CUFF TRANSITION
OK 07.11.22

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WORK ORDER
NO. 43073

RELEASED
06.10.31

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DATE		06.10.31		DRAWING NO.	REV. D
				D350-748-241	SHEET 3 OF 3
				TITLE	SCALE
				CROSSTUBE (AS 350/355 HI AFT)	1:4



VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 105611-1

☒ HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489

☐ 2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380

☐ QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

01/26/2009

MM / DD / YYYY

PAGE: 1

BILL TO: 1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
01/26/2009		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
7849		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141	EA	12	12	
	Process Specifications: Procedure: 4353				
	HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1D				
	100% HARDNESS CHECKED AS PER ASTM E-18				
	40/45 HRC				
	MATERIAL: 4130				
	D350-748-141-B43674, B43675, B43676, B43677, 4 PCS				
	D350-748-241-B43670, B43671, B43672, B43673, B43678, B43679, B43680, B43681, 8 PCS				
	<i>Sorglo 129</i>				
	<i>* Parts were not sandblasted *</i>				

100% HARDNESS TESTED

12 pcs.

42/43 HRC



I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant there o in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

James Robinson
Authorized Q.C. Inspector



**VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS**

